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AN EVALUATION OF IN VIVO DESENSITIZATION AND VIDEO MODELING TO INCREASE COMPLIANCE WITH DENTAL PROCEDURES IN PERSONS WITH MENTAL RETARDATION

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Fear of dental procedures deters many individuals with mental retardation from accepting dental treatment. This study was conducted to assess the effectiveness of two procedures, in vivo desensitization and video modeling, for increasing compliance with dental procedures in participants with severe or profound mental retardation. Desensitization increased compliance for all 5 participants, whereas video modeling increased compliance for only 1 of 3 participants.

DESCRIPTORS: compliance, medical procedures, mental retardation, video modeling

Because many individuals with mental retardation avoid or resist dental treatment, physical restraints and chemical sedation are commonly used to control their disruptive behaviors (Davila, 1990). Unfortunately, research evaluating behavioral interventions for dental avoidance in persons with mental retardation is limited. In an early study, Kohlenberg, Greenberg, Reymore, and Hass (1972) used shaping and fading procedures to teach children with mental retardation to sit in the dental chair and keep their mouths open during dental treatment. In a later study, Luscre and Center (1996) found a combination of in vivo desensitization, video modeling, and reinforcement to be effective in teaching children with mental retardation to tolerate dental examinations. More recently, Neumann, Altabet, and Fleming (2000) used in vivo desensitization, video modeling, and reinforcement to treat 3 dental-phobic adults with mental retardation. After treatment, all 3 participants were able to tolerate a dental procedure. Given the limited amount of research on the treatment of avoidance of dental procedures in persons with mental retardation and the use of treatment packages involving multiple components, it is not clear which treatment components are most effective. The purpose of this study was to evaluate in vivo desensitization and video modeling for the treatment of noncompliance with dental procedures in persons with mental retardation. These two

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procedures were chosen because they are the major components of previous research with individuals with mental retardation and also have been shown to be effective with children undergoing dental procedures (e.g., Melamed, Hawes, Helby, & Glick, 1975).

METHOD

Participants

Six participants in the severe to profound range of mental retardation participated. All lived in community group homes in a town of approximately 8,500 people. The participants were referred by their staff as exhibiting excessive avoidance of dental procedures defined as disruptive and inappropriate behavior (i.e., crying, yelling, hitting, biting, grabbing, refusing to enter the dental office or sit in the dental chair, not responding to the dentists' requests, or attempting to leave the dental chair) that interfered with routine dental examinations. All 6 participants received anxiolytic medication (alprazolam, diazepam, or lorazepam) prior to dental appointments. In addition, leg and arm restraints were used during dental exams with 4 of the participants. Emily was a 47-year-old woman with profound mental retardation. Shaun was a 46-year-old man with profound mental retardation. Evan was a 33-year-old man with profound mental retardation. Lucy was a 43-year-old woman with severe mental retardation. Adam was a 54-year-old man with severe mental retardation and seizure disorder. Amanda was a 45-year-old woman with profound mental retardation. The university institutional review board and the agency's research committee approved this study.

Setting

Baseline, in vivo desensitization, and probe sessions were conducted at a dental school in a typical dental office (4 m by 4 m) containing a dental chair and various dental instruments and equipment. Video modeling was conduced in an assessment room (5 m by 6 m) at the participants' sheltered workshop that contained a chair, a desk, and a television with VCR.

Measurement and Reliability Assessment

During baseline and at periodic intervals during treatment, we assessed the participants' compliance with an 18-step task analysis associated with a dental examination (see the Appendix). *Compliance* was defined as engaging in the behavior specified in each step of the task analysis. During each baseline and probe session, a participant progressed through the task analysis steps until he or she refused to continue, and the session was ended. Baseline and probe sessions lasted up to 5 min. Two observers independently recorded the participants' compliance with the task analysis steps. In addition, the two observers independently recorded the experimenter's adherence to a predefined checklist of desensitization and video modeling steps. Interobserver and procedural reliability were assessed during 80% of sessions for each participant. Agreement coefficients were calculated by counting the number of steps for which both observers agreed (on whether or not compliance occurred), dividing that sum by 18 (the total number of steps), and multiplying that quotient by 100%. A procedural reliability score was calculated by dividing the number of agreements on the experimenter behaviors listed in the checklist by the total number of agreements plus disagreements during that session and multiplying by 100%. Interobserver and procedural reliability scores were 100%.

Procedure

A multiple baseline design across participants was used to evaluate treatment effectiveness. Following baseline, 3 participants received desensitization and 3 participants received video modeling. If a participant did

not achieve all steps in the task analysis following one treatment, the other treatment was implemented. Treatment continued until a participant's progress stabilized. Treatment sessions lasted approximately 10 min. Probe and treatment sessions were conducted on separate days over the course of 8 months. Probe or treatment sessions occurred once or twice per week. Follow-up sessions were conducted 1 month after the final probe session.

Baseline. Each participant was brought by vehicle to the dental office by a known staff member. Once there, the staff member told the participant, "you are going to see the dentist for a check-up," and prompted him or her to engage in Steps 1 and 2 of the task analysis. Following this, the researcher, dressed in dentist attire and introduced as the dentist, asked the participant to engage in each task analysis step in sequence (the researcher was introduced as a dentist to increase the realism of the procedures and to facilitate generalization). The dentist or staff person did not provide additional prompts or praise for completion of each step in the task analysis. Probe sessions were identical to baseline sessions.

In vivo desensitization. This phase was the same as baseline, except that the dentist and staff person gave the participant enthusiastic praise, encouragement, and verbal and physical prompts throughout each task analysis step. When the participant appeared relaxed and calm at one step, he or she was prompted to complete the next step. The session continued until the participant refused to complete a step in the task analysis. After the participant had achieved Step 18 during one or more treatment sessions, a probe session was conducted. Treatment sessions followed by periodic probe sessions continued until the participant's progress through the task analysis stabilized at or near Step 18. The exception was Amanda, who did not progress beyond Step 13.

Video modeling. During this phase, the participant was taken to the meeting room with the television and VCR to watch a 15-min video of a well-known staff person (the third author) exhibiting appropriate behavior during each step of the task analysis and receiving praise for appropriate behavior. The participant watched the video on two separate occasions and then participated in a probe session. This process was repeated until the participant achieved no further success in the task analysis in three consecutive probe sessions. Lucy watched the video twice, Amanda watched six times, and Adam watched eight times.

RESULTS AND DISCUSSION

The task analysis steps completed by the participants who began with desensitization are presented in the left panel of Figure 1. Emily, Shaun, and Evan all achieved the 18 steps in simulated dental exams following treatment. The results were maintained at follow-up for Emily and Evan, and to a lesser extent for Shaun. The task analysis steps completed by the participants who began with video modeling are presented in the right panel of Figure 1. Video modeling was effective for Lucy but not for Adam and Amanda. Desensitization was effective when it was implemented following video modeling for Adam, who achieved all 18 steps in the task analysis, and to a lesser extent for Amanda, who progressed only to Step 13. It is not clear why video modeling was effective for Lucy. Perhaps her higher level of compliance during baseline was a factor that contributed to its success.

These findings suggest that desensitization may be successful in promoting compliance with dental procedures in persons with mental retardation and that video modeling is much less effective. In addition, this study demonstrated that compliance with dental procedures did not improve after the partic-

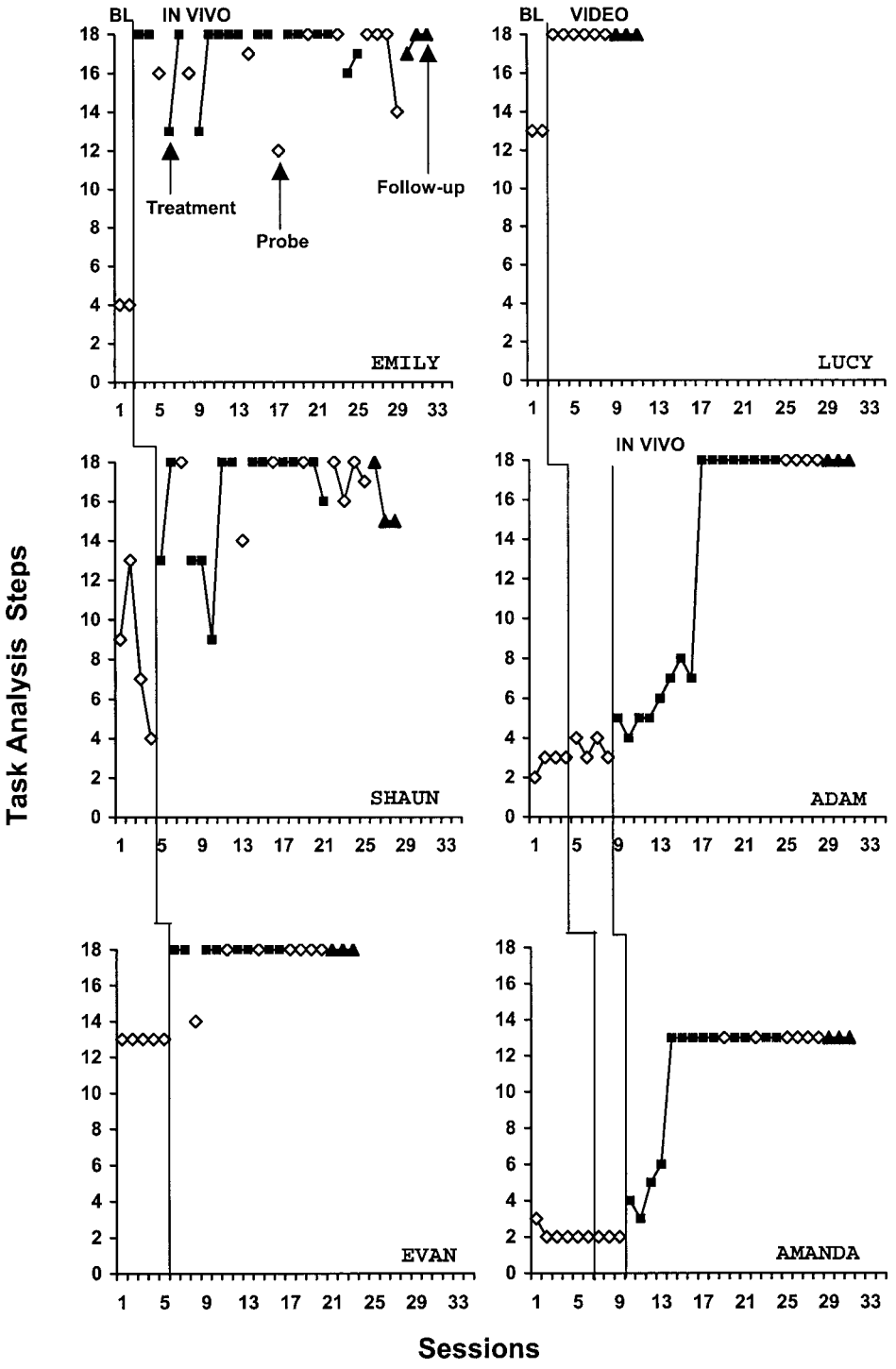

Figure 1. The task analysis steps completed during baseline and probe sessions (diamonds), treatment sessions (squares), and follow-up sessions (triangles) for participants receiving in vivo desensitization (left panel) and video modeling (right panel).

ipant was repeatedly exposed to a dental environment or a simulated dental exam in baseline. Although the participants were engaged in simulated dental exams in an actual dental office during baseline sessions, they did not progress through or complete the steps in the task analysis until desensitization (and in one case, video modeling) was introduced.

Two basic behavioral principles were involved in the desensitization procedure: demand fading and differential reinforcement. Demand fading occurred when the participant was asked to engage in only one step in the task analysis at a time and was asked to engage in subsequent steps only when compliance was observed with previous steps. Differential reinforcement consisted of praise for compliance and withdrawal of attention for competing behaviors. Similar procedures have been used successfully with children to increase cooperative behavior during dental treatment (e.g., Allen & Stokes, 1987).

One limitation of this study is that we were unable to formally evaluate the effectiveness of desensitization during subsequent actual dental procedures. However, 3 of the participants (Evan, Amanda, and Lucy) underwent dental exams approximately 1 month after treatment and were described as "much more cooperative" by their staff and dentist.

A second limitation is that actual dentists were not involved and real dental work was not completed during the simulated dental examinations. Because we used a laboratory simulation of actual dental procedures, we can conclude only that these individuals successfully tolerated some of the stimulus conditions that patients encounter during real dental examinations and care. Therefore, future replications should extend to more intrusive procedures (i.e., teeth cleaning), and the task analysis steps should include these procedures.

A final limitation is that desensitization required a large time commitment and the continual availability and cooperation of dental facilities and staff. Therefore, future research should evaluate ways to make desensitization procedures more efficient (e.g., LeBlanc et al., 2003). For example, an agency that serves individuals with mental retardation might acquire a dental chair and equipment and establish a mock dental office to conduct treatment sessions on site. In addition, researchers might evaluate various parameters of desensitization to determine how it can be made more efficient (i.e., multiple sessions per day, longer sessions, tangible reinforcers, etc.).

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APPENDIX

Task Analysis Steps

1. The staff member says, "you are going to see the dentist for a check-up," and the participant enters the waiting room accompanied by the staff person.

2. The participant sits in the waiting room with his or her staff person for 1 min.

3. The researcher (dressed in dentist attire) approaches the participant and introduces him- or herself as "the dentist who'll be checking your teeth." The researcher asks the participant to follow him or her into the dental office. The participant enters the dental office and remains standing until the researcher asks the participant to come over to the dental chair.

4. When the researcher asks the participant to come over to the dental chair, the participant walks to the chair.

5. When the researcher asks the participant to sit in the chair, the participant sits in the chair and remains seated for 10 s.

6. When the researcher tells the participant he or she is going to hear suction sounds, the participant sits in the chair while tolerating suction sounds for 10 s.

7. When the researcher tells the participant he or she is going to hear drill sounds, the participant sits in the chair while tolerating drill sounds for 10 s.

8. When the researcher tells the participant the chair will be leaned back and he or she will hear suction sounds, the participant leans back in the chair and tolerates suction sounds for 10 s.

9. When the researcher tells the participant the chair will be leaned back and he or she will hear drill sounds, the participant leans back in the chair and tolerates drill sounds for 10 s.

10. When the participant is leaning back in the chair, the researcher tells the participant a dental bib will be placed around his or her neck, and the participant leans back in the chair and tolerates the bib for 10 s.

11. When the participant is leaning back in the chair wearing the dental bib, the researcher tells the participant he or she will hear suction sounds, and the participant leans back in chair with the bib on and tolerates suction sounds for 10 s.

12. When the participant is leaning back in the chair wearing the dental bib, the researchers tells the participant he or she will hear drill sounds, and the participant leans back with the bib on and tolerates drill sounds for 10 s.

13. When the participant is leaning back in the chair wearing the dental bib, the researcher tells the participant the dental light will be turned on, and the participant leans back in chair, wears the bib, listens to drill and suction sounds, and tolerates dental light for 10 s.

14. When the participant is leaning back in the chair wearing the dental bib, the researchers asks the participant to keep his or her mouth open, and the participant leans back in chair, wears the bib, and keeps his or her mouth open for 10 s.

15. Same as 14 plus suction sounds.

16. Same as 14 plus drill sounds.

17. Same as 14 plus suctions sounds, drill sounds, and dental light.

18. Same as 17. In addition to suction sounds, drill sounds, and dental light, a dental mirror is placed in the participant's mouth for 10 s.